

What is claimed is:

1. A tank for holding a liquid for a liquid ring vacuum pump, the liquid ring vacuum pump having a vacuum input port, an exhaust output port and a liquid inlet port, the tank comprising:

an inlet port in fluid communication with the exhaust port of the vacuum pump;

a first outlet port in fluid communication with atmosphere, the first outlet port positioned above an expected waterline in the tank; and

a second outlet port in fluid communication with the liquid inlet port of the vacuum pump, the second outlet port positioned below the expected waterline in the tank.

2. A tank according to claim 1 further comprising:

a sediment trap; and

a drain port or plate for draining sediments from the sediment trap.

3. A tank according to claim 1 wherein the tank includes:

a top;

sides; and

a bottom, the bottom configured to capture sediments in a selected region; and

a drain port situated near the selected region for selectively draining the sediments.

4. A tank according to claim 3 wherein the selected region is lower than the remainder of the bottom.

5. A tank according to claim 4 wherein the bottom is sloped down to the selected region.

6. A tank according to claim 4 wherein the selected region is spaced from the second outlet port.

7. A tank according to claim 4 wherein the second outlet port is positioned higher than the selected region.

8. A tank according to claim 1 wherein the tank includes:
two opposing sides;
the inlet port and the second outlet port positioned on one of the opposing sides of the tank; and
means for directing the exhaust of the vacuum pump received via the inlet port of the tank towards the other opposing side of the tank.

9. A tank according to claim 8 further comprising:
a sediment trap positioned towards the other opposing side of the tank; and
a drain port for draining sediments from the sediment trap.

10. A tank according to claim 1 further comprising:

a filter positioned between the second outlet port of the tank and the liquid inlet port of the vacuum pump.

11. A tank according to claim 10 wherein the filter includes a sediment trap.

12. A tank according to claim 10 wherein the filter includes a porous material or substance.

13. A tank according to claim 1 further comprising a muffler in line with the first outlet port of the tank.

14. A separator for use with a pump assembly that has a vacuum pump and a main pump, the separator comprising:

a main reservoir;

a main intake port into the main reservoir;

a main output port from the main reservoir, the main output port in fluid communication with a main intake port of the main pump;

an inner tank disposed within the main reservoir, the inner tank being fluidly isolated from the main reservoir, the inner tank including:

an inlet port in fluid communication with an exhaust port of the vacuum pump;

a first outlet port in fluid communication with atmosphere, the first outlet port positioned above an expected waterline in the inner tank; and

a second outlet port in fluid communication with a liquid inlet port of the vacuum pump, the second outlet port positioned below the expected waterline in the inner tank.

15. A separator according to claim 14, wherein the inner tank further comprises:
a sediment trap; and
a drain port for draining sediments from the sediment trap.

16. A separator according to claim 15, further comprising:
a filter positioned between the second outlet port of the inner tank and the liquid inlet port of the vacuum pump.

17. A pump assembly comprising:
a main pump, the main pump pumping fluid to a pump output, the fluid at the pump output being under pressure;
a liquid ring vacuum pump, the liquid ring vacuum pump having a vacuum input port, an exhaust output port and a liquid inlet port, the liquid inlet port for receiving a liquid;
a vacuum pump supply tank for supplying liquid to the liquid inlet of the liquid ring vacuum pump; and
a valve for selectively providing fluid to the vacuum pump supply tank.

18. A pump assembly according to claim 17, wherein the valve selectively provides fluid from the pump output to the vacuum pump supply tank.

19. A pump assembly according to claim 17 further comprising a filter for filtering the fluid from the pump output before it is provided to the vacuum pump supply tank.

20. A pump assembly according to claim 17 further comprising sensing means for sensing a level of liquid in the vacuum pump supply tank.

21. A pump assembly according to claim 20 further comprising control means coupled to the sensing means to selectively control the valve, the control means selectively opening the valve when the sensing means detects a first level of liquid in the vacuum pump supply tank and closing the valve when the sensing means detects a second lower level of liquid in the vacuum pump supply tank.

22. A separator for use in a pump assembly, the separator comprising:
a reservoir;

a float system including a float that extends into the reservoir and a one-way valve controlled by the float; and

the one-way valve allowing fluids and/or air to enter the reservoir, but not allowing fluids and/or air to exit the reservoir.

23. A separator according to claim 22 wherein the one-way valve is controlled by

the level of the float in the reservoir.

24. A separator according to claim 23 wherein the one-way valve places the reservoir in one-way fluid communication with the atmosphere when the float is in a first upper position and cuts off fluid communication between the reservoir and the atmosphere when the float is in a second lower position.

25. A separator according to claim 24 wherein the valve includes intermediate positions enabling restricted one-way fluid communication between the atmosphere and the reservoir.

26. A separator for use with a pump assembly that has a vacuum pump and a main pump, the separator comprising:

- a main reservoir for storing pump fluid for the main pump;

- a main intake port into the main reservoir;

- a main output port from the main reservoir in fluid communication with a main intake port of the main pump;

- a vacuum port positioned above an expected waterline in the reservoir, the vacuum port in fluid communication with an inlet port of the vacuum pump; and

- deflector means positioned adjacent to, but spaced from, the vacuum port, the deflector means for deflecting pump fluid that is directed at the vacuum port.

27. A separator according to claim 26 wherein the deflector means comprises a plate, the plate having a lateral dimension that is greater than a lateral dimension of the vacuum port.

28. A separator according to claim 26 further comprising a valve interconnecting the inlet port of the vacuum pump to either the vacuum port of the reservoir or atmosphere.

29. A separator according to claim 28 wherein the deflector means is also a first float, and the valve is controlled by the level of the first float in the reservoir.

30. A separator according to claim 29 wherein the valve places the inlet port of the vacuum pump in fluid communication with the atmosphere when the first float is in an upper position and places the inlet port of the vacuum pump in fluid communication with the vacuum port of the reservoir when the first float is in a lower upper position.

31 A separator according to claim 30 further comprising a second float that extends into the reservoir and a one-way valve controlled by the second float; the one-way valve allowing fluids and/or air to enter the reservoir, but not allowing fluids and/or air to exit the reservoir.

32. A separator according to claim 31 wherein the one-way valve is controlled by the level of the second float in the reservoir.

33. A separator according to claim 32 wherein the one-way valve places the reservoir in one-way fluid communication with the atmosphere when the second float is in an upper position and cuts off fluid communication between the reservoir and the atmosphere when the second float is in a lower position.

34. A separator according to claim 33 wherein the upper position of the second float is lower than the upper position of the first float.

35. A separator for use in a pump assembly, the separator comprising:
a reservoir;
a first valve for creating variable fluid communication between the reservoir and a vacuum pump;
a second valve for creating variable fluid communication between the reservoir and the atmosphere.

36. The separator of claim 35 wherein the degree of fluid communication between the reservoir and the vacuum pump and the degree of fluid communication between the reservoir and the atmosphere is determined based on the height of a fluid in the reservoir.

37. The separator of claim 35 wherein the degree of fluid communication between the reservoir and the vacuum pump and the degree of fluid communication between the

reservoir and the atmosphere is determined by monitoring a time change in height of a fluid in the reservoir.